COVER SHEET

This is the author version of article published as:

Turrell, Dr Gavin and Mathers, Colin D (2001) Socioeconomic Inequalities in All-cause and Specific-cause Mortality in Australia: 1985-87 and 1995-97. *International Journal of Epidemiology* 30(2):pp. 231-239.

Socioeconomic inequalities in all cause and specific cause mortality in Australia: 1985-97 and 1995-97

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Background. Socioeconomic inequalities in mortality have been repeatedly observed in Britain, the United States, and Europe, and in some countries, there is evidence that the differentials are widening. This study describes trends in socioeconomic mortality inequality in Australia for males and females aged 0-14, 15-24 and 25-64 years over the period 1985-87 to 1995-97.

Methods. SES was operationalised using the Index of Relative Socioeconomic Disadvantage, an area based measure developed by the Australian Bureau of Statistics. Mortality differentials were examined using age-standardised rates, and mortality inequality was assessed using rate ratios, gini coefficients, and a measure of excess mortality.

Results. For both periods, and for each sex/age sub-group, mortality rates were highest in the most disadvantaged areas. The extent and nature of socioeconomic mortality inequality differed for males and females and for each age group: both increases and decreases in mortality inequality were observed, and for some causes, the degree of inequality remained unchanged. If it were possible to reduce death rates among the SES areas to a level equivalent to that of the least disadvantaged area, premature all–cause mortality for males in the three age groups would be lower by 22%, 28% and 26% respectively, and for females, 35%, 70% and 56%.

Conclusions. The mortality burden in the Australian population attributable to socioeconomic inequality is large, and has profound and far-reaching implications in terms of the unnecessary loss of life, the loss of potentially economically productive members of society, and increased costs for the health care system.
Keywords: Socioeconomic status, mortality inequality, Australia, area-based measures.

INTRODUCTION

Despite marked improvements in the health of their populations, Great Britain, the United States and many European countries continue to observe mortality inequalities between socioeconomic groups.[1-3] There is now a large literature which shows that the socioeconomically disadvantaged experience higher mortality rates for most major causes of death, and this inequality exists for both males and females at every stage of the life-course and is evident irrespective of how socioeconomic status (SES) has been defined and measured. There is also growing evidence that mortality inequalities have widened over time in these countries.[4-11] These increasing disparities appear to be due to faster declines in mortality among the higher SES groups,[4,12] although in some countries there is evidence of an actual increase in mortality rates for some conditions among the most disadvantaged groups.

Socioeconomic inequalities in mortality have also been repeatedly observed within the Australian population,[13-16] however, changes in the extent and nature of mortality inequality by SES have received only limited coverage. This present study extends a mortality analysis that was conducted by Mathers using data for the period 1985-87.[17-19] As part of this research, Mathers used an area-based measure of SES to examine inequalities in all-cause and specific-cause mortality for children (0-14 years), young adults (15-24 years) and working-aged adults (25-64 years) and found that persons living in socioeconomically disadvantaged areas experienced the worst health. Using these data and findings as a baseline, we employ an identical methodology and use the same life-course groupings to examine trends and inequalities in mortality for males and females over the 10-year period 1985-87 to 1995-97. Four issues are addressed. First, we determine whether the mortality inequalities in 1985-87 were still evident a decade later in 1995-97. Second, we investigate whether the differentials have widened, consistent with the trend observed in many other countries. Third, we attempt to locate the basis of any widening inequality: are the increasing disparities due to faster reductions in the mortality rates of higher SES groups, or a worsening of the health status of the most disadvantaged, as reflected in an increase in mortality rates. Fourth, we estimate the extent to which socioeconomic inequalities in mortality contributes to the overall burden of mortality within the population. In other words, how much of a country's all-cause and specific cause mortality can be attributed to variability between socioeconomic groups, and what would be the likely reduction in mortality if all socioeconomic groups had a mortality rate equivalent to that of the highest SES group.

METHODS

Measurement of socioeconomic status

In keeping with the earlier work by Mathers, [17-19] this present study uses a geographic measure known as the Index of Relative Socioeconomic Disadvantage (IRSD) developed by the Australian Bureau of Statistics (ABS) using data collected in the 1986 and 1996 Census to categorise areas on the basis of their social and economic characteristics.[20-21] The IRSD is constructed using Principal Components Analysis and is derived from attributes such as low income, low educational attainment, high levels of public sector housing, high unemployment, and jobs in relatively unskilled occupations. The IRSD is compiled initially at the Collector's District (CD) level, a census collection unit broadly equivalent in urban areas to a small group of suburban blocks, comprising approximately 250 dwellings (CDs in rural regions usually contain fewer dwellings). Lower IRSD scores are indicative of greater socioeconomic disadvantage. This study uses IRSD scores for Statistical Local Areas (SLAs), which in most cases correspond to council boundaries defined by Local Government Areas. IRSD scores for each SLA are constructed by taking the weighted average, using population counts from the 1986 and 1996 Census, across all CDs comprising the SLA. In aggregate, SLAs cover the whole of Australia without gaps or overlaps. For the years 1985-87 and 1995-

97, deceased persons were classified into quintiles of socioeconomic disadvantage according to the value of the IRSD for their SLA of usual residence, with Q_1 corresponding to the highest socioeconomic group and Q_5 the lowest. SLAs were grouped into quintiles so that each quintile contained approximately 20% of the total Australian population.

Mortality analysis

Mortality for the years 1985-87 and 1995-97 is expressed using rates per 100 000 population directly age standardised (using five-year age groups) to the total mid-year Australian population in 1988. Unit record mortality registration data for the two periods were obtained from the ABS, where deaths were coded according to the Ninth Revision of the International Classification of Diseases (ICD-9). For males and females in each of the age groups 0-14, 15-24 and 25-64 years, age-standardised rates were calculated for all causes, for specific causes that were major contributors to all cause mortality (e.g. cancer) and for selected causes that contributed most to the specific cause (e.g. lung cancer). Population data by age, sex and SLA were also supplied by the ABS and consisted of estimates of the population in 1985-87 and 1995-97 for each of the aforementioned sex/age subgroups and SLAs grouped into quintiles of socioeconomic disadvantage. These population estimates were derived using data from the 1986 and 1996 Census, adjusted for under-enumeration.

Measures of mortality inequality

Mortality inequality across the quintiles of socioeconomic disadvantage was assessed using three measures: the rate ratio, the Gini coefficient, and excess mortality.

Rate Ratios. The age standardised mortality rate for the most socioeconomically disadvantaged quintile (Q_5) is expressed as a multiple of the standardised rate for the least disadvantaged quintile (Q_1). Thus, for example, the rate ratio for all cause mortality for males aged 0-14 years in 1985-87 is 1.50 ($Rate_{Q1}/Rate_{Q5}$ = 125.6/83.8). Other researchers have also used the rate ratio to identify the direction and quantify the magnitude of socioeconomic inequalities in mortality. [11-12]

Gini coefficient. In recent years, studies examining socioeconomic health inequalities have made increasing use of the Gini coefficient [22-24] particularly as an indicator of income inequality.[25-26] The Gini coefficient is based directly on the Lorenz Curve, ‘a graphical device for displaying the cumulative share of total income accruing to successive income intervals’.[25] In Figure 1, for example, the *X* and *Y* ordinates represent the proportion of people and income respectively, the 45° diagonal is the line of equality and the dashed line is the Lorenz Curve. If no inequality exists, the Lorenz Curve corresponds to the line of equality. As the extent of inequality increases, so does the area between the line of equality and the Lorenz Curve. The Gini coefficient is defined as the area enclosed by the line of equality and the Lorenz Curve expressed as a proportion of the area below the diagonal and is bounded to range from zero (complete equality) to one (complete inequality). In this present study we use a form of the Lorenz curve in which cumulative deaths are plotted against cumulative population across the five quintiles Q5 to Q1 (ranked in terms of decreasing disadvantage). Even if age-specific death rates were equal across all quintiles, there would still be inequality if population age structures differ across the quintiles (since there will be more deaths in older populations). To remove the effects of population age structure on the Lorenz curve we have plotted cumulative numbers of age-standardized death across quintiles. The corresponding Gini index measures the degree of mortality inequality across the quintiles of socioeconomic disadvantage, excluding inequality due purely to population age structure differences. The term ‘Gini coefficient’ is used here to refer to a measure of mortality inequality based on population groups ranked by socioeconomic status rather than health status. Wagstaff et al have referred to these as health or ill-health concentration indices.[27]

Figure 1 about here

Excess mortality. Kunst has proposed mortality inequality measures that are not only sensitive to the effect of socioeconomic status on mortality, but in addition, take into account the size of the socioeconomic groups that are compared.[28] These measures address the total impact that socioeconomic differences in mortality have on the mortality level of the general population. We have constructed an excess mortality measure which estimates the percentage of deaths for any sex/age subgroup that potentially could be avoided if all quintiles had the same age standardised mortality rate as the least disadvantaged quintile (Q_1). In effect, the measure identifies the burden of mortality in the Australian population that is attributable to socioeconomic disadvantage.

Statistical testing

Although analytical solutions for the confidence intervals for the mortality inequality measures can be constructed, we used a simulation approach to estimate 95% confidence intervals. Observed deaths were assumed to follow Poisson distributions, and Latin hypercube sampling was carried out using the @RISK software program.[29] All measures of mortality inequality shown in Tables 2 and 4 differ significantly from no inequality (1 for the rate ratio, and 0 for the Gini coefficient and excess mortality) at significance level $p<0.001$. Asterisks attached to the 1995-97 estimates indicate the level of significance of the difference between the 1995-97 values and the corresponding 1985-87 values against the null hypothesis of no difference.

RESULTS

Tables 1 presents age standardised mortality rates for males and females in the first, third and fifth quintiles of the IRSD (hereafter referred to as high, middle and low SES). To save space, data for the second and fourth quintiles are not presented: almost without exception, death rates for these quintiles were intermediate between high, middle and low SES. For the period 1985-87 death rates were consistently highest for those living in the most disadvantaged areas. This pattern was evident for both males and females in each of the three age groups and was observed for all causes, for broad cause groups (eg circulatory system disease) and for individual causes (eg stroke). Despite marked overall declines in mortality rates between 1985-87 and 1995-97 for the majority of conditions, the differentials observed in the earlier period were still evident a decade later. During 1995-97, for example, infants and children living in the most disadvantaged areas experienced the highest mortality rates for perinatal conditions and sudden infant death syndrome (SIDS), and for injury and poisoning. Similarly, males and females aged 25-64 residing in the most disadvantaged areas experienced the highest death rates for all cause mortality, for grouped causes such as circulatory, respiratory and digestive system diseases, and for individual causes such as coronary heart disease and stroke, motor vehicle traffic accidents and asthma/emphysema.

Table 1 about here

For some conditions there was an actual increase in the mortality rates over the decade. Among those aged 15-24 there was a marked rise in death rates due to illicit drug dependence or harmful use, particularly among males and those in the high SES areas. For this age group there was also an increase in the rate of male suicide in the middle and low SES quintiles, and a corresponding increase for females in the high and middle SES quintiles.

Further, among males aged 25-64, mortality rates increased (or remained largely unchanged) for diabetes mellitus, suicide, and asthma/emphysema, and for females of the same age, increases in death rates were evident for diabetes mellitus, lung cancer and asthma/emphysema, with the largest increases being found in the middle and low SES quintiles.

Table 2 presents aged-standardised rate ratios and Gini coefficients by socioeconomic disadvantage of area for males and females for the periods 1985–87 and 1995–97. When assessing changes in mortality inequality over the decade, we gave greatest weight to the Gini coefficient, as it reflects the degree of inequality across all socioeconomic quintiles. Less weight was given to the rate ratio, as it simply reflects the magnitude of the differential between the fifth and the first quintile. Among males, there was evidence of increased mortality inequality by SES for all causes (0–14 and 15–24 years), SIDS, injury and poisoning (0–14 and 15–24 years), motor vehicle traffic accidents (all age groups) and suicide (15–24 years). For males aged 25–64 increases were also evident for circulatory system disease (including coronary heart disease), cancer (including lung cancer), and asthma/emphysema. Mortality inequality remained relatively unchanged between 1985 and 1997 for perinatal conditions, stroke, diabetes mellitus, and for respiratory system disease classified at the broad cause level. Decreases in mortality inequality were evident for drug dependence, and among males aged 25–64 years for all cause mortality, injury and poisoning (including suicide), pneumonia/bronchitis and digestive system diseases.

Table 2 about here

Among females, increased mortality inequality by SES was observed for SIDS, motor vehicle traffic accidents (15–24 and 25–64 years), and for coronary heart disease, diabetes mellitus, cancer (including lung cancer) and respiratory system diseases (including asthma/emphysema). There was little change in mortality inequality between 1985 and 1997 for injury and poisoning (0–14 years), and among those aged 25–64 years for all cause mortality, circulatory system disease classified at the broad group level, and digestive system diseases. Decreases in mortality inequality by SES were evident for all causes (0–14 and 15–14 years), perinatal conditions, injury and poisoning (15–24 and 25–64 years), drug dependence, and motor vehicle traffic accidents (0–14 years). For females aged 25–64 decreases were also evident for stroke, suicide, and pneumonia/bronchitis.

As part of the analysis, we also examined the basis of change in mortality over the 10-year period between the areas of socioeconomic disadvantage: in other words, were the declines in mortality similar or different across the SES quintiles (Table 3). For males aged 0-14 and 15-24 years, declines in mortality rates tended to be greatest in the top quintile and smallest in the bottom quintile, although there were a number of exceptions to this pattern (eg perinatal conditions, injury and poisoning). For females, declines in mortality by SES for these two age groups were somewhat the reverse that of males: for the majority of conditions the greatest declines occurred in the most disadvantaged quintiles, although again there were a couple of exceptions (eg SIDS, motor vehicle traffic accidents). Among males and females aged 25-64 years, no discernible pattern was evident with respect to mortality declines. There were roughly equal instances where the declines were greater in the top and bottom quintiles, and for a number of conditions the rate of decline was similar for each quintile (e.g. stroke for both sexes, circulatory system and coronary heart disease among women).

Table 3 about here

Table 4 presents estimates of the mortality burden that is attributable to variability in death rates across the quintiles of socioeconomic disadvantage. Interpretation of the estimates is straightforward. Take for example, lung cancer rates for males for the period 1995-97. If quintiles Q2–Q5 had the same rate as the highest SES quintile (Q1), mortality from lung cancer among males aged 25–64 would be lower overall by approximately one-third (35%). This estimate has increased significantly since 1985-87, where approximately one-fifth (23%) of overall lung cancer deaths among males of this age group were due to variability between the SES quintiles. For males, increases in mortality burden over the decade were evident for many other conditions, most notably, SIDS, motor vehicle traffic accidents (0–14 and 15–24 years), suicide (15–24 years), coronary heart disease, diabetes mellitus, cancer and asthma/emphysema. The only apparent anomaly in an otherwise fairly consistent pattern were male deaths due to drug dependence: here the estimate for 1995-97 (0%) reflects the fact that since 1985-87 death rates due to illicit drug use have tended to equalise across the SES quintiles. For males aged 0–14 years in 1995-97, potential reductions in overall mortality ranged from 10% for perinatal conditions to 51% for SIDS. Among males aged 15–24, potential reductions for the same period ranged from 25% for suicide to 44% for motor vehicle traffic accidents, and for those aged 25–64, potential reductions ranged from 19% for cancer to 53% for asthma/emphysema.

Among females, mortality burden due to variability across the SES quintiles was considerably higher than for males: this pattern was evident for both periods and for all conditions. The only notable changes in mortality burden between 1987 and 1997 for females was in terms of perinatal conditions (a reduction from 45% to 24%) and asthma/emphysema (an increase from 38% to 60%). The estimates of mortality burden for females suggested that substantial reductions in overall mortality would occur if all quintiles had a death rate equivalent to that of the highest SES quintile. For females aged 0–14 in 1995-97, this ranged from 24% for perinatal conditions to 66% for SIDS. For females aged 15–24 the potential reductions were in the range 70% for all causes to 79% for injury and poisoning and motor vehicle traffic accidents, and for those aged 25–64, potential reductions ranged from 23% for cancer to 84% for coronary heart disease. Finally, the estimates of mortality burden for drug dependence among females (-41) reflects the fact that since 1985-87 the relationship between SES and this cause of death has reversed direction. During the earlier period, the highest death rates for drug dependence were observed in the most disadvantaged areas, whereas for the period 1995-97 rates were highest in the least disadvantaged areas.

Table 4 about here

DISCUSSION

This study examined socioeconomic inequalities in mortality in Australia for the periods 1985-87 and 1995-97 using an area-based measure of SES. Before discussing the study's findings, we need to consider a number of potential sources of bias in the mortality analyses, and in the use of the Index of Relative Socioeconomic Disadvantage. First, death rates are calculated using numerator data that are collected as part of the mortality registration process, whereas the denominator data are derived from the population census. Mortality rates will be in error to the extent that deaths for a particular sex/age sub-group attributed to an SLA are not in fact drawn from that SLA.[17] Quantifying the magnitude of bias resulting from these types of errors is difficult, however, our best estimates indicate that misclassification of deaths based on sex and place of residence is small, thus the overall impact on the mortality rate is likely to be minimal.[30]

Second, prior to calculating the mortality rate it was necessary to exclude death records where the identifier for the SLA of usual residence was missing, or where it was not possible to assign the SLA an IRSD score (because of small population numbers, IRSD was not calculated for a few SLAs). These problems arose for approximately 3% and x% of deaths in 1985-87 and 1995-97 respectively. The exclusion of these cases will have had little effect on the estimates of mortality inequality for each of the two periods.

Third, in assessing the mortality inequalities reported here, it should be kept in mind that the Australian population has been classified into quintiles using a small area based index of socioeconomic disadvantage. This index relates to the average disadvantage of all people living in the area and so the resultant mortality inequalities will be smaller than if the population were classified using individual socioeconomic status or areas defined at a lower level than SLA (eg. census districts).

Finally, it should be noted that the IRSDs for each reference period were calculated using data from the relevant population censuses and hence some SLAs may have changed quintile between 1986 and 1996. Additionally, there are differences between some SLA boundaries for the two time periods. Thus the corresponding quintiles for 1985-87 and 1995-97 do not consist of exactly the same areas, although for both periods, the bottom and top quintiles contain the 20% most disadvantaged and 20% least disadvantaged as measured by the IRSD.

Between 1985-87 and 1995-97 mortality rates for the majority of causes declined markedly for all SES quintiles. Despite these overall improvements in health however, both periods were characterised by large socioeconomic inequalities. Death rates were typically highest in the most disadvantaged areas for both males and females in each age group. Moreover, mortality rates very often fell in a continuous linear gradient from the most to the least disadvantaged quintile. Thus in Australia, as elsewhere,[31] mortality inequalities are not confined to differences between the “rich” and “poor”, but rather, are observed across the entire socioeconomic spectrum.

Mortality rates for a number of conditions increased (or remained relatively stable) between 1985 and 1995. Among both sexes this was evident for suicide, drug dependence, diabetes mellitus and asthma/emphysema, and for lung cancer among women. Increases in rates of suicide are consistent with that reported in other Australian studies,[32] and when viewed in conjunction with a rise in illicit drug deaths, suggest a worsening in the mental and psychosocial health of some sections of the Australian population, most particularly, adolescents and young adults. Male deaths due to drug dependence have followed an unusual path since 1985-87. During this earlier period, males living in the most disadvantaged areas exhibited the highest death rates. By 1995-97, mortality rates for drug dependence had increased for males in all SES areas, most notably in the least disadvantaged quintiles, resulting in an equalizing of the rates (to around six deaths per 100 000) and a concomitant reduction of the inequality. Increases in mortality rates for asthma/emphysema and lung cancer among women were limited mainly to the middle and low SES quintiles and presumably reflect a number of interrelated factors directly linked to tobacco consumption. These may include higher smoking rates in disadvantaged areas, limited reach and uptake of anti-smoking campaigns and hence lower cessation rates, and increases in cigarette smoking among young women.[33-34]

During the last decade or so, studies conducted in Britain,[4-5] the US [7-8] and Europe[10-11] have found that mortality inequalities between socioeconomic groups have widened over time for many conditions. The results of this present study indicate that similar trends are occurring for some conditions in Australia. Among males aged 0-14 and 15-24 years, mortality inequality increased for all causes and for each other listed cause except perinatal conditions and drug dependence. Increases in mortality inequality for females in these age groups were less common than that found for males: between 1985-87 and 1995-97 mortality differentials increased only for SIDS and motor vehicle traffic accidents. Among males and females aged 25-64, mortality inequality increased for 6 and 8 conditions respectively, with increased differentials being evident for a number of the major contributors total mortality in Australia, such as circulatory system disease (including CHD) and cancer (including lung cancer). Overseas studies have reported that increases in mortality inequality among socioeconomic groups are due mainly to greater declines in death rates among the high SES.[4,12] The results of this present study generally concur with this evidence. Most of the significant increases in mortality inequality between 1985-87 and 1995-97 were associated with a greater decline in death rates in the high SES areas. Importantly, not all increases occurred for this reason. As was mentioned earlier, for some conditions, such as diabetes mellitus and asthma/emphysema among both sexes, and lung cancer among women, increases in mortality inequality were due to an actual increase in mortality rates in the most disadvantaged quintile.

Although a number of increases in socioeconomic mortality inequalities occurred over the reference period, for many causes, inequalities actually lessened or remained relatively unchanged. Indeed for females, this pattern was evident for 14 of the 24 listed conditions (including all causes), and among males, it occurred for nine conditions. The simultaneous occurrence of widening, narrowing and unchanging mortality inequalities according to area disadvantage is difficult to explain, especially if one attempts to do so solely on the basis of broad ranging explanations that are pitched at the macro level. Moreover, explanations for these trends are further complicated by a different patterning of inequalities between males and females of different ages. Is it possible, for example, to account for these differing trends on the basis of an explanation that conceptualises each as being due to increasing social and income inequality in society? In terms of the changing pattern of mortality inequality, therefore, it may be necessary to also seek explanations that are more narrowly conceived, that are specific to a particular cause or group of causes with a similar aetiologic profile, and that occur over a similar timeframe. Injury and death due to accidents for example, are likely to be a consequence of events occurring within a narrow timeframe, and are likely to be due to the direct impact of material and physical conditions in the wider environment. Coronary heart disease by contrast, is likely to be due mainly to the cumulative impact of psychosocial and behavioural factors occurring over many decades. It may also be necessary to focus our explanatory lens on a particular sex/age subgroup. The mechanisms and processes underpinning increases in mortality inequality for motor vehicle traffic accidents among males aged 0-14 years are likely to be qualitatively different from those that contributed to decreases in mortality inequality for suicide among females aged 25-64 years.

The final section of this study's analysis estimated the extent to which socioeconomic inequalities in age-standardised death rates contributed to the total mortality burden in the general population. In other words, if it were possible to reduce death rates among the SES areas to a level equivalent to that of the least disadvantaged quintile, what would be the potential savings in premature mortality. The results of this analysis showed that the mortality burden attributable to socioeconomic inequality was large, and that for many conditions, the burden had increased significantly between 1985 and 1997. Among males in the three age groups for example, excessive all cause mortality in the mid-to-late 1990s was 22%, 28% and 26% respectively. Among females, the corresponding excesses were 35% (0-14 years), 70% (15-24 years) and 56% (25-64 years). If we express this excess mortality in terms of the absolute numbers of premature deaths, then the mortality burden attributable to socioeconomic inequality is particularly stark. For the period 1995-97, a reduction of 26% in all cause mortality among males aged 25-64 would have resulted in a saving over the period of approximately 12 418 premature deaths. The corresponding figures for circulatory system disease and cancer were 4190 and 2944 deaths respectively. For females in the same age group, the number of premature deaths attributable to socioeconomic inequality was approximately 14 532 for all causes, 3504 for circulatory system disease, and 3038 for cancer.

The size of the mortality burden attributable to variability among the quintiles of area disadvantage in Australia clearly has profound and far-reaching implications: not only in terms of the unnecessary loss of life, but also in terms of the loss of potentially economically productive members of society, and added costs for the health care system and other public sectors more generally.[35] In so called ‘civil’ societies such as Australia, therefore, there is ample justification on humanistic, social, and economic grounds to strive towards the reduction and eventual elimination of all socioeconomic health inequalities.

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Figure 1 **The Lorenz Curve: Hypothetical example**

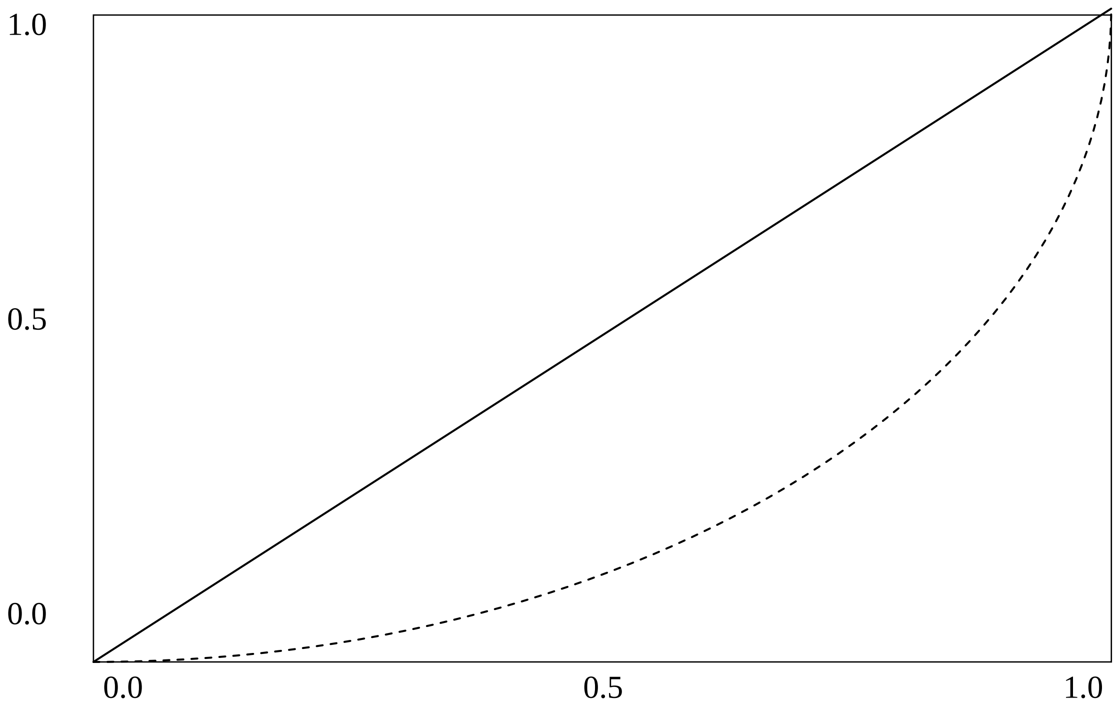

Table 1: Age standardised mortality rates (per 100 000) by socioeconomic disadvantage of area: males and females, 1985–87 and 1995–87

	Males						Females					
	1985-87			1995–97			1985-87			1995–97		
Age Group/Mortality Type	Q1	Q3	Q5	Q1	Q3	Q5	Q1	Q3	Q5	Q1	Q3	Q5
0 – 14 years												
All Cause	83.8	98.3	125.6	48.0	61.4	77.6	58.7	73.9	97.9	40.3	50.0	58.5
Perinatal conditions	23.5	22.8	36.0	16.5	17.4	22.9	15.1	19.6	28.6	13.8	14.4	19.4
Sudden Infant Death Syndrome	16.3	18.8	19.5	2.7	6.2	7.4	8.7	11.0	14.7	1.9	4.7	6.0
Injury and Poisoning	12.4	18.6	25.1	7.3	10.9	16.1	7.6	10.2	14.0	4.8	6.9	8.4
MV Traffic Accident	6.2	7.7	9.4	2.2	3.9	5.5	3.6	4.4	6.9	1.9	2.1	2.7
15 – 24 years												
All Cause	100.2	136.1	149.3	72.6	107.8	129.4	40.2	46.8	61.9	29.9	37.3	42.0
Drug dependence	3.0	3.4	5.6	6.1	6.6	6.7	1.7	1.4	2.6	3.0	1.2	2.7
Injury and Poisoning	79.2	109.2	116.1	48.5	82.1	96.0	23.6	30.7	39.2	15.7	22.7	23.4
MV Traffic Accident	42.8	64.5	60.0	17.4	36.9	39.3	14.2	20.5	22.2	6.6	11.8	12.1
Suicide	20.3	23.6	27.4	19.8	28.4	34.7	5.8	5.2	7.5	6.1	6.3	5.8
25 – 64 years												
All Cause	338.4	449.6	568.5	250.4	364.5	410.8	189.9	235.5	285.5	150.1	191.1	218.4
Circulatory System	125.7	166.6	207.8	63.2	98.7	118.2	41.1	65.5	80.8	22.2	35.5	44.7
Coronary Heart Disease	96.0	121.9	149.0	43.0	68.1	80.7	21.2	36.8	47.1	10.1	18.0	23.5
Stroke	13.1	19.1	27.5	7.7	11.9	16.0	10.8	15.8	18.4	6.0	9.1	10.2
Diabetes Mellitus	4.2	5.7	7.3	4.3	6.9	9.0	1.9	3.8	5.8	1.9	4.4	6.7
Cancer	117.9	138.9	150.6	90.3	115.6	125.4	102.7	106.4	112.9	86.0	93.5	97.9
Lung cancer	29.7	40.7	47.3	17.6	29.1	34.8	8.9	11.5	14.1	9.1	12.9	15.8
Injury and Poisoning	50.6	72.1	99.2	43.7	65.6	76.9	17.8	21.9	30.1	14.7	20.6	21.6
Suicide	19.5	24.8	33.7	22.2	29.2	33.8	6.9	7.3	9.9	6.6	8.2	7.6
MV Traffic Accident	16.8	23.1	28.9	8.4	15.2	19.6	6.8	8.4	11.2	3.4	6.6	7.5
Respiratory System	13.7	23.4	31.7	8.0	15.1	20.0	8.8	12.7	18.2	6.1	11.6	16.2
Pneumonia, bronchitis	1.9	3.3	7.1	2.1	2.9	3.7	0.9	1.0	3.6	1.1	1.8	3.0
Asthma, emphysema	5.1	8.8	9.7	4.4	10.2	13.3	4.7	6.3	6.8	3.8	8.1	11.2
Digestive System	10.3	20.3	31.4	8.8	14.9	19.3	5.4	8.2	12.2	3.9	6.5	8.7

1. Q1,Q3 and Q5 correspond to high, middle and low SES quintiles of the IRSD respectively

Table 2: Summary measures of mortality inequality by socioeconomic disadvantage of area: 1985–87 and 1995–97

	Males				**Females**			
	Rate Ratio [1]		Gini coefficient [2]		Rate Ratio [1]		Gini coefficient [2]	
Age Group/Mortality Type	1985-87	1995-97	1985-87	1995-97	1985-87	1995-97	1985-87	1995-97
0 – 14 years								
All Cause	1.50	1.62**	0.07	0.09**	1.67	1.45**	0.10	0.07**
Perinatal conditions	1.54	1.39**	0.08	0.08	1.90	1.41**	0.13	0.07**
Sudden Infant Death Syndrome	1.20	2.73**	0.04	0.17**	1.69	3.24**	0.11	0.19**
Injury and Poisoning	2.02	2.21*	0.11	0.13**	1.84	1.75	0.11	0.11
MV Traffic Accident	1.53	2.49**	0.07	0.16**	1.95	1.40**	0.14	0.08**
15 – 24 years								
All Cause	1.49	1.78**	0.07	0.10**	1.54	1.40**	0.09	0.07**
Drug dependence	1.91	1.11**	0.13	0.04**	1.52	0.89**	0.07	0.01**
Injury and Poisoning	1.47	1.98**	0.06	0.12**	1.66	1.49*	0.10	0.07**
MV Traffic Accident	1.40	2.26**	0.05	0.14**	1.56	1.83**	0.08	0.12**
Suicide	1.35	1.75**	0.05	0.09**	1.30	0.95**	0.03	0.03**
25 – 64 years								
All Cause	1.68	1.64**	0.10	0.09**	1.50	1.45**	0.07	0.07**
Circulatory System	1.65	1.87**	0.09	0.11**	1.97	2.01	0.12	0.14**
Coronary Heart Disease	1.55	1.88**	0.08	0.11**	2.22	2.34**	0.14	0.16**
Stroke	2.10	2.07	0.13	0.12**	1.71	1.70	0.10	0.09**
Diabetes Mellitus	1.73	2.07**	0.12	0.12	3.04	3.49**	0.18	0.22**
Cancer	1.28	1.39**	0.05	0.06**	1.10	1.14**	0.01	0.02**
Lung cancer	1.60	1.98**	0.08	0.12**	1.58	1.73**	0.07	0.10**
Injury and Poisoning	1.96	1.76**	0.12	0.09**	1.69	1.47**	0.09	0.06**
Suicide	1.73	1.52**	0.10	0.06**	1.42	1.15**	0.06	0.01**
MV Traffic Accident	1.73	2.33**	0.09	0.15**	1.66	2.21**	0.08	0.12**
Respiratory System	2.31	2.49**	0.16	0.16	2.06	2.64**	0.13	0.17**
Pneumonia, bronchitis	3.72	1.76**	0.27	0.12**	4.24	2.80**	0.29	0.18**
Asthma, emphysema	1.90	3.02**	0.12	0.18**	1.43	2.94**	0.06	0.18**
Digestive System	3.06	2.20**	0.20	0.14**	2.26	2.21	0.16	0.15

1. Ratio between SMR for fifth quintile (low SES) to first quintile (high SES). 2. Age-standardised Gini Coefficients. 3. All mortality inequality values differ from no inequality (1 for the rate ratio and 0 for the Gini coefficient) at significance level p<0.001. Asterisks attached to the 1995-97 estimates indicate level of significance of the difference from the corresponding 1985-87 value: * p <0.01, ** p <0.001

Table 3: Percentage change in age-standardised mortality rate between 1985-87 and 1995-97

	Males			Females		
Age Group/Mortality Type [1]	Q1	Q3	Q5	Q1	Q3	Q5
0 – 14 years						
All Cause	**-43**	-38	-38	-31	-32	**-40**
Perinatal conditions	-30	-24	**-36**	-9	-27	**-32**
Sudden infant death syndrome	**-83**	-67	-62	**-78**	-57	-59
Injury and Poisoning	**-41**	**-41**	-36	-37	-32	**-40**
MV Traffic Accident	**-65**	-49	-41	-47	-52	**-61**
15 – 24 years						
All Cause	**-28**	-21	-13	-26	-20	**-32**
Drug dependence	103	94	20	76	**-14**	4
Injury and Poisoning	**-39**	-25	-17	-33	-26	**-40**
MV Traffic Accident	**-59**	-43	-35	**-54**	-42	-45
Suicide	**-2**	20	27	5	21	**-23**
25 – 64 years						
All Cause	-26	-19	**-28**	-21	-19	**-24**
Circulatory System	**-50**	-41	-43	**-46**	**-46**	-45
Coronary heart disease	**-55**	-44	-46	**-52**	-51	-50
Stroke	-41	-38	**-42**	-44	-42	**-45**
Diabetes mellitus	2	21	23	0	16	16
Cancer	**-23**	-17	-17	**-16**	-12	-13
Lung cancer	**-41**	-29	-26	2	12	12
Injury and Poisoning	-14	-9	**-22**	-17	-6	**-28**
Suicide	14	18	0	-4	12	**-23**
MV Traffic Accident	**-50**	-34	-32	**-50**	-21	-33
Respiratory System	**-42**	-35	-37	**-31**	-9	-11
Pneumonia, bronchitis	11	-12	**-48**	22	80	**-17**
Asthma, emphysema	**-14**	16	37	**-19**	29	65
Digestive System	-15	-27	**-39**	-28	-21	**-29**

1. Largest mortality declines are indicated in bold

Table 4: Excess mortality [1] by socioeconomic disadvantage of area, 1985-87 and 1995-97

	Males		Females	
Age Group/Mortality Type	1985 – 87	1995 – 97	1985 – 87	1995 – 97
0 – 14 years				
All Cause	17	22*	42	35*
Perinatal conditions	14	10*	45	24*
Sudden infant death syndrome	11	51*	53	66*
Injury and Poisoning	32	37*	58	59
MV Traffic Accident	18	44*	53	51
15 – 24 years				
All Cause	22	28*	69	70*
Drug dependence	19	0*	10	-41
Injury and Poisoning	22	34*	77	79*
MV Traffic Accident	25	44*	75	79*
Suicide	13	25*	75	77
25 – 64 years				
All Cause	24	26*	57	56*
Circulatory System	24	32*	75	76*
Coronary heart disease	21	33*	83	84*
Stroke	34	36	46	50*
Diabetes mellitus	24	32*	66	70*
Cancer	12	19*	23	23
Lung cancer	23	35*	77	66*
Injury and Poisoning	30	30	75	76
Suicide	24	23	73	77*
MV Traffic Accident	27	41*	70	76*
Respiratory System	37	43*	60	57*
Pneumonia, bronchitis	47	22*	76	60*
Asthma, emphysema	33	53*	38	60*
Digestive System	48	37*	73	72

1. Percent of deaths that would be avoided if all quintiles had the same mortality rate as Q1 (ie the highest SES group)
2. All excess mortality values differ from no inequality at significance level p<0.001. Asterisks attached to the 1995-97 estimates indicate level of significance of the difference from the corresponding 1985-87 value: * p <0.001